United Nations Industrial Development Organization

Distr.
LIMITED

ID/WG.436/3
29 January 1985

ENGLISH

Expert Group Meeting on the Restructuring
of the Non-ferrous Metals Industries

Vienna, Austria, 18 - 21 March 1985

THE RESTRUCTURING PROCESS IN THE NON-FERROUS METALS INDUSTRIES AND THE POSSIBILITIES FOR FURTHER PROCESSING OF NON-FERROUS METALS IN DEVELOPING COUNTRIES

Discussion paper *

Prepared by the

UNIDO secretariat

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V.85-21674

Foreword

The aim of this short paper is to synthesize the most relevant aspects of the topics developed in the two background papers prepared for this meeting. It should serve as an impulse for discussion of the present situation and future development of the non-ferrous metals industries, particularly from the perspective of the developing countries.

This discussion should center around the following main aspects:

(a) an anlysis of the new patterns of development of the non-ferrous metals industries and the strategies of the main actors, within the context of the global restructuring process that is taking place in the world economy;

(b) identification of the possibilities, advantages and constraints for a further processing of non-ferrous minerals in the developing countries that would lead to a more integrated and self-reliant developme..t;

(c) identification of key issues that could be discussed at the first consultation on the non-ferrous metals industries.

1. Introduction

During the late 1970s and early 1980s important changes took place in the non-ferrous metals industries. This turning point was due to the global restructuring process in the world economy, resulting from the crisis of the 1970s and the consequent reactions of the main actors trying to overcome it and to search for new patterns of growth.

The world restructuring process has modified the economic situation and bargaining position of many developing country non-ferrous metals producers, bringing them to a re-evaluation of their undertakings in the mineral raw materials sector.

It is in the context of the new world economic situation that different medium- and long-term patterns of development in the non-ferrous metals industries are emerging. It is of crucial importance to determine the essential aspects of these new patterns, and within them the strategies of the main actors, in order to establish the possibilities, advantages, and barriers for increased processing of non-ferrous minerals in the developing countries.

Increased processing of minerals has become a key element in developing countries proposals for a New International Economic Order. The primary reasons that developing country governments have advocated increased local mineral processing include: industrialization strategies based on a more integrated development; limitation of transnational corporations' ability to engage in transfer pricing; creation of opportunities for the training of nationals and the development of skills which can be used in other sectors of the economy; capture of a greater share of the economic rent from mineral production; and the hope of obtaining access to capital which might not otherwise be available.

2. Evolution of the non-ferrous metals industries in the 1970s and early 1980s.

The development of the non-ferrous metals industries has been influenced in this period by global economic stagnation, basic changes in the patterns of demand for non-ferrous metals, and modifications in the production structure of these industries.

The non-ferrous metals industries are very sensitive to fluctuations in the global economy because of the role of non-ferrous metals as intermediate products for the capital goods sector. The seven major OECD countries that are the main consumers of non-ferrous metals products experienced slow rates of growth of Gross National Product (GNP) in the late 1970s and decreases in GNP in the early 1980s.

These low growth rates in the industrialized countries have also, as has been widely noted, had a strong impact in restricting the growth of export-oriented developing countries, by reducing demand for these nations' exports and by contributing to the now chronic over-supply situation for most non-ferrous metals, a situation that has resulted in metal prices which are currently at or near the lowest point, in real terms, that has been reached in the past 40 to 50 years. This is a clear expression of the limits and conflicts that a predominantly externally-oriented economic development creates in developing countries.

Major changes are occurring in the quantity and quality of the demand for non-ferrous metals products by the main users; this is affecting the level and structure of production in the non-ferrous metals industries. There has been a significant decrease in the growth of the capital goods sector, the main consumer of non-ferrous metals products, over the past few years, as well as changes in its structure caused by the appearance of new technological processes and advances in manufacturing technique tending to reduce the weight of non-ferrous metals used in the fabrication of machinery and equipment. Furthermore, the steel industry, a major user of non-ferrous metals, has remained generally depressed, despite its recovery in some areas. Non-ferrous metals are also being replaced by alternative materials such as plastics and glass fibres.

The situation in the non-ferrous metals industries can also be attributed to a great extent to changes in the supply structure, due particularly to the increases in energy prices. As the non-ferrous metals industry is one of the most energy-intensive industrial sectors, the increase in energy prices is generating technological changes, plant closures, and the redeployment of production capacities toward energy-rich countries.

The world-wide rate of growth of consumption of non-ferrous metals in the period 1970-1983 was very slow. Even for aluminium, the most buoyant of the metals, the 1970-83 consumption growth rate was only 3 per cent per annum, while copper, nickel and zinc showed growth rates between 1 per cent and 2 per cent, and tin consumption a negative growth rate of 0.6 per cent. For more details see Table 1 (page 16).

In general, changes in production followed the evolution of consumption; however, the need of the developing countries for foreign currency caused them to increase production at a faster rate than consumption grew, which increased stocks, especially in the early 1980s, after their reduction following the recession of 1974-75. Non-ferrous metal prices, after recovering from the effects of the 1974-75 recession, rose, generally reaching their peak in 1979, but falling in the early 1980s. For more details see Table 2 (page 17).

3. The structure of the non-ferrous metals industries

The main characteristics of the structure of the non-ferrous metals industries, in the context of the global restructuring process in the world economy, are the following:

a) The structure of the non-ferrous metals mining and processing industries depends to a great extent on the growth and logic of development of the capital goods sector. Metals such as aluminium and nickel, because of their characteristics (light weight, etc.), are more linked with the present pace-setter capital goods industries, while the heavier metals are linked with the more traditional capital goods industries and with other sectors of the economy.

b) The developed market economies, which are the main producers of capital goods, are the major consumers of non-ferrous metals, mainly aluminium and nickel. These countries are also the major processors of the minerals, although they are not the main mining producers.

In 1980 the developed market economies consumed approximately 68.2 per cent of the world's primary aluminium 67.9 per cent of refined tin, 60.6 per cent of refined lead, and 57.1 per cent of slab zinc.

The developed market economies account for a major share of global output of processed metals, more than 50 per cent for all metals except tin. Their percentage share in processed output of all metals is much higher than their contribution to global mining output. In 1980, the developed market economies accounted for 68 per cent of world production of primary aluminium, 61.6 per cent of the production of refined lead, 60.7 per cent of slab zinc, 57 per cent of smelter-refined nickel, 50 per cent of refined copper, and 14.5 per cent of refined tin.

The developed market economies are major mining producers of zinc, lead and nickel. In 1980, they produced 51.5 per cent of the world mining output of zinc, 46.5 per cent of lead and 39.8 per cent of nickel. They produced a smaller share of bauxite (36.9%), copper (30.3%), and tin (7.1%).

c) The developing countries only participate to a small extent in world consumption and processing of non-ferrous metals, despite their major share in mining production. The development of their non-ferrous metals industries is externally oriented, which is reflected in the high share of exports in their total production of non-ferrous metals.

The developing countries have a relatively low share of world metals consumption, due to the relatively low development of the sectors that are the main users of processed non-ferrous metals, primarily the capital goods sector. In 1980, the shares of the developing countries were 13.4 per cent of the consumption of slab zinc, 5.7 per cent of refined nickel, 11.3 per cent of refined lead, 8.9 per cent of refined copper and 9.2 per cent of primary aluminium.

The participation of developing countries in industrial production is insignificant compared to their contribution to mining output, as a result of the low level of integration that these countries have between their mining activities and the different industrial processing operations. Tin is the only metal in which the developing countries have a high participation in processing output. In 1980 the developing countries accounted for 70.7 per cent of the world production of refined tin, a share similar to their contribution to mining output. For copper, their share was 23.2 per cent, for smelter-refined nickel production 15.3 per cent, for refined lead 13.5 per cent, for slab zinc 12.2 per cent, and for primary aluminium 10.7 per cent.

Developing countries are the major producers of mining output in tin, bauxite and copper. In 1980 they produced 76.8 per cent of the world mining output of tin, 50.5 per cent of bauxite and 43.9 per cent of copper. In nickel they produced 34.6 per cent, in lead 24.3 per cent and in zinc 22.7 per cent.

The share of exports in production of the processed metals under study is in general terms higher in the developing countries than in the developed market and centrally planned economies, reflecting the more outward-oriented development of the metal industries in developing countries. The share of exports of these countries in total production varies from 89.2 per cent in tin to 35.6 per cent in lead. By comparison, in the developed market economies the share varies from 75.1 per cent in nickel to 18.6 per cent in copper, and the ratio of exports to production in the centrally planned economies is very low, ranging from 15.6 per cent for nickel to 2 per cent for lead.

d) The centrally planned economies have a low participation in world trade, compared with the other groups of countries, because their production is mainly oriented to satisfy their domestic demand.

The centrally planned economies have a low share in both exports and imports of processed metals. Their contribution to world exports varies from 10.7 per cent in the case of nickel to 1.9 per cent in tin. With respect to imports, their share does not exceed 15 per cent of the world's imports of any of the different metals. They import 9.5 per cent of lead, 14.3 per cent of zinc, 4.2 per cent of copper, and 5.1 per cent of aluminium.

The centrally planned economies had similar shares in the world production of processed metals output to those in mining. The only exception is aluminium, where their share in processed output is much higher than in production of bauxite. The participation of these countries in world processing output of the different metals is approximately 20 per cent, with the exception of tin, which is only 7.8 per cent.

In 1980 centrally planned economies consumed 24.3 per cent of slab zinc, 23.8 per cent of refined nickel, 22.9 per cent of refined lead, 20.1 per cent of refined copper, 18.1 per cent of refined tin and 17.7 per cent of primary aluminium.

e) The non-ferrous metals industries have a high level of concentration. In the cases of aluminium and nickel, where concentration is very high, production is concentrated mainly in the hands of the TNCs. In the other metals there is a greater participation of developing country state enterprises (copper, tin) and of small and medium-sized enterprises (zinc, lead).

In aluminium, the six major TNCs accounted for approximately 57.8 per cent of the world market economy's bauxite production and the thirteen biggest enterprises accounted for 76.3 per cent. Among these enterprises are three state enterprises that produce approximately 9.3 per cent of world production. The six major transnational corporations accounted for 41.3 per cent of world market economy production of aluminium.

In nickel, eight companies account for 79 per cent of the world market economy mining capacity and 76.9 per cent of their processing capacity. The six major TNCs participate with 69.7 per cent of the mining and 68.8 per cent of the processing capacity, and the two major state enterprises from developing countries have 9.3 per cent of mining capacity and 8.1 per cent of processing.

In copper, 53.4 per cent of the developed market economy mining production is accounted for by twelve enterprises, Codelco (Chile) being the major company. This is a state enterprise that has approximately 11.5 per cent of the world market economy's mine capacity. The eight most important TNCs contribute 27.3 per cent of the world market economy's capacity and the

four most important state enterprises of the developing countries have 26.1 per cent. In processing output capacity, the 15 major enterprises hold 73 per cent of total smelter capacity in the market economies and 63 per cent of refinery capacity. The twelve major TNCs contribute 48.9 per cent of smelter capacity and 46.7 per cent of refinery capacity. The three major developing country state enterprises participate with 24.1 per cent of the smelter capacity and 16.3 per cent of the refinery capacity.

In tin, the three major mining enterprises are state companies. The major company is P.T. Timah (Indonesia) which produces 10 per cent of world mining output, the second is Comibol (Bolivia) with 9 per cent, and finally the Malaysia Mining Corporation Bhd. (MMC), with 8.5 per cent. In processing, eight companies have approximately 88.9 per cent of the world market economy's tin smelting capacity. Two major state enterprises of the developing countries participate with 17.1 per cent (P.T. Timah, Comibol), the major private company from the developing countries is from Malaysia, with 17.1 per cent, and the five major TNCs have 54.7 per cent.

In zinc, eleven major companies concentrate 45.2 per cent of world mining capacity in the market economies. Centromin, a Peruvian State enterprise that is among the eleven major companies, contributes 4.9 per cent of the world capacity. In zinc reduction, eleven major enterprises account for approximately 53.7 per cent of the world market capacity. In Europe, five corporate groups account for 80 per cent of all zinc reduction capacity, with state-owned firms in Finland, Yugoslavia, Italy, Austria and Spain making up the remainder. The major firm is Société Générale de Belgique which holds 40 per cent of European reduction capacity. The other major firms in the European industry include Rio Tinto Zinc, Metellgesellschaft, Preussag, and Imetal-Peussaroya.

In lead, no single firm or group has more than approximately 8 per cent of the total of the world market economy's primary lead refining capacity; however, the major thirteen account for 67.4 per cent of this capacity. The major developing country state enterprises are from Mexico (Penoles, Industria Minera Mexico) and account for approximately 10 per cent of the capacity of the world market economies.

4. Changes in the structure of the non-ferrous metals industries

The main changes in the structure of the non-ferrous metals industries in the 1970s were the following:

a) The developing countries generally increased their share in world mining output. The main increases were in copper and nickel, with increases of 4.9 per cent and 3.9 per cent respectively in the period between 1972 and 1980. In the case of tin there was a slight increase of 1.3 per cent in the share of the developing countries, in zinc and lead their contribution was practically without change, and in bauxite there was a decrease of 0.8 per cent.

The developed market economies decreased their share of mining output in all the minerals under study, with the exception of bauxite, where they had an increase of 4.4 per cent. There were considerable reductions in their shares in the mining production of nickel and copper - of 8.5 and 8.1 per cent respectively. Their decrease in mining production of zinc was by 3.7 per cent, of lead 3.1 per cent, and of tin 0.5 per cent.

The centrally planned economies increased their participation in almost all the minerals with the exception of bauxite, where they experienced a decrease of 4.6 per cent.

b) The developing countries increased their share in the consumption of processed metals in the period 1972-1980. These increases were, in general, higher than the percentage increment they experienced in the share of the world mining production, with the exceptions of copper and nickel, where the percentage increase was slightly lower.

The increases in the shares of the developing countries in world consumption were greatest in zinc, nickel and copper. In these three metals the increases were 4.6 per cent in zinc, and 3.4 per cent in the other two metals. In aluminium they increased their participation in world consumption by 2.8 per cent, in tin by 2.7 per cent, and in lead by 2.2 per cent.

Between 1972 and 1980, the developed market economies decreased their share in world consumption of all the metals under consideration. Their decrease in aluminium consumption was 5.2 per cent, which contrasts with their 4.4 per cent share increase in bauxite production. In zinc, tin and lead, the percentage decreases in their shares in consumption were greater that those for mining output. In zinc they decreased their share by 10.5 per cent, in tin by 7 per cent and in lead by 3.5 per cent. In nickel and in copper the decreases in their shares in consumption were less in percentage terms than they were in mining output. Their shares decreased by 3.8 per cent in nickel, and in copper by 7.5 per cent.

In the period 1972-1980, the centrally planned economies increased their share of world consumption of all metals with the exception of aluminium where their share remained the same. They increased their participation in consumption to a greater extent than in mining production for zinc, tin and lead. In zinc they increased their share by 5.1 per cent, in tin by 4 per cent, and in lead by 1.1 per cent. In nickel and in copper the percentage increases in their shares in consumption were relatively smaller than in mining output, being 1.7 and 2.1 per cent respectively.

c) In the 1970s the developing countries increased their participation in the production of the processed metals under study, with the exception of lead where they had a slight decrease. The increases in their share of processing output were higher than in their share of world consumption for aluminium, copper and tin, and smaller for the other metals. The increases were: 4.5 per cent for aluminium, 3.7 per cent for copper, and 8.7 per cent for tin. In the other metals, the increases were 2.7 per cent for nickel, 2.6 per cent for zinc, and a slight decrease of 0.1 per cent for lead.

The developed market economies decreased their share in the world processing output in the 1970s in all the metals, with the exception of lead, where they experienced a slight increase of 1 per cent. Their percentage decrease was greater in production than in consumption for copper (8%) and in tin (7.4%). For the other metals the decreases in the share of output processing were smaller: 4 per cent for aluminium, 3.7 per cent for nickel and 5.1 per cent for zinc.

The centrally planned economies had an increase in the share of the processing output in all the metals under study with the exception of aluminium and lead. Their increment in the share of industrial production was higher than the increase in their share in consumption only in the case of copper.

d) Between 1972 and 1982 the developing countries increased their share in world exports of all the metals, with the exception of lead where there was a slight decrease. Their share in world imports decreased for nickel and aluminium, remained the same for tin, and increased considerable for zinc and lead.

The developed market economies decreased their share in world exports, with the exception of lead and zinc, where they had an increase. These countries also experienced a decrease in their share of world imports, with the exception of tin, where they had a slight increase. The centrally planned economies decreased their share in world exports in all the metals with the exception of copper and nickel, and increased their share in the imports of all metals.

e) The concentration of the non-ferrous metals industries has decreased, lessening the importance of the oligopolistic barrier to entry into these industries for newcomers, which are mainly developing countries.

This decrease in the degree of concentration was due mainly to the reduction of the dominant role played in the 1950s by the enterprises of the United States and England, due to the increasingly important role played by enterprises from Japan and Europe and by national enterprises of developing countries.

f) The non-ferrous metals industries have experienced changes in their patterns of investment. Since approximately the end of the 1960s the major TNCs have decreased their direct investment in the developing countries.

The new patterns of investment that are taking place have created an apparent paradox in the pattern of mining and processing of non-ferrous metals, a paradox that lies in the decreasing direct investment in equity by the TNCs in the developing countries, and the increased participation of the developing countries in mining, consumption, processing and trade.

This apparent contrast can be explained by the increasing role of the governments in the developing countries, and initiatives taken by the TNCs for conversion from fully foreign-owned subsidiaries into joint ventures with national enterprises. This is also explained by the important substitution of loans for equity in the financing of non-ferrous metals projects in developing countries. In relation with this aspect, there was a reduction of private equity from 88 or 90 per cent of the total capital up to 1960, to about a third by the 1970s.

This spread of new patterns of investment arrangements has accelerated since the mid-1970s by the appearance of new sources of finance such as the transnational oil companies, governments of the oil-producing countries, insurance companies from western countries, and merchant finance and equipment-leasing schemes.

5. Projections for Non-ferrous Metals

With the exception of aluminium and, to a lesser extent nickel, the outlook for demand for the major non-ferrous metals is negatively affected by the substantial decline in intensity of use which has occurred since the oil price increase of 1973-74, and especially since the second major round of oil price increases in 1979-80. In the case of copper, for example, the use of optical fibers has substantially eroded the potential for growth in copper consumption in communications, one of the metal's major traditional markets. At the same time, copper use in the automotive industry has been substantially cut back by the use of plastics and other substitutes and by the development of metals-saving technologies, as, for example, in light-weight automobile radiators. Similarly, the use of zinc in automobiles has declined substantially, as weight-saving technologies are adopted in order to provide better fuel economy. And the traditional market for tinplate in beverage cans has been virtually eliminated by the substitution of aluminium, plastic and glass containers.

Despite substantial recovery in the demand for aluminium in 1983, most observers agree that the longer-term outlook for aluminium demand is for increases that more or less approximate world economic growth rates. Assuming continuation of recent OECD growth rates, an aluminium consumption growth of 3-4 per cent per annum appears to be a reasonable estimate.

The outlook for copper demand, at least in the 1980s, is universally agreed to be pessimistic. The 1970-83 growth rate of 1.7 per cent is a rough approximation of the current forecasts for consumption growth over the next decade (once again, assuming a continuation of recent OECD growth rates).

Nickel demand is largely derived from the demand for steel, and has been sharply affected by the depression in the steel industry, especially since 1980. For the longer term, few predictions of nickel demand foresee growth rates much in excess of the 1 per cent per annum level that has been achieved since 1970.

Although world-wide demand for lead was somewhat stronger than that for copper or nickel in the 1970-83 period, the longer term outlook appears to be more pessimistic. A growth rate somewhat less than the overall OECD economic growth rate seems a reasonable forecast for lead demand for the coming decade. Also, few industry analysts foresee demand for zinc rising faster than overall OECD economic growth.

Demand for tin has now been declining for many years; it appears that tin is a fully "mature" metal, and that the development of substantial new areas of use is extremely unlikely.

6. Prospects for further processing in developing countries

In view of the limited success developing countries have had with import-substitution strategies for industrialization and the limited number of countries that have been able to pursue successfully an export-oriented strategy for industrialization based on manufacturing or assembly operations, strategies of resource-based industrialization have been claiming increasing attention from developing-country planners. Two variations of such strategies have been tried. One, which could be called "primary export processing," is based on the assumption that more processing of, and, hence, more value-added from, primary product exports will speed the overall development of an economy. Success in pursuing such a strategy depends on the ability of the processed materials to compete in world markets, although it may be possible for a producer-country government to subsidize processing by making inputs, such as energy or infrastructure, available at lower than market prices.

The second strategy, which can be called "basic goods production," concentrates on the use of agricultural and natural-resource products not primarily for export, but rather for domestic consumption. This approach is in direct contrast to the typical post-colonial trade pattern in much of the Third World, where primary-product exports are used as a means of generating foreign exchange to pay for the import of intermediate and capital goods for import-substitution industries.

Many resource-rich developing countries have pursued a combination of the two strategies. Some developing countries with a relatively important industrial infrastructure have increased domestic processing of non-ferrous minerals, both for export and for use in domestic industries. Countries with a smaller domestic industrial base have vigorously pursued further processing as a means of adding value to exports, while countries with greater domestic opportunities, such as Mexico, have emphasized the basic goods production aspect of mineral processing. Many of the petroleum-producing countries have adopted ambitious industrialization plans based on export-oriented refining and the use of natural gas as a feedstock for petrochemical production.

In general, the governments of mineral-exporting developing countries are investigating the possibilities of increasing their economic diversification through a further processing of their non-ferrous minerals, motivated by the fact that an economic model based on unprocessed mineral exports may, in the long run, not provide an adequate basis for sustained and self-reliant development that can generate the desired expansion of GNP, employment, foreign currency earnings and public revenue. The process of diversification can strengthen the links in the industrial sector because local processing of one product makes possible primary production of another one, and can indirectly stimulate the production in the capital goods industry and other sectors of the economy that are the main users of semi-processed and processed non-ferrous metals products.

Through further processing, the developing countries can increase their national value-added and in some cases can also sell to a wider range of potential customers than can a producer of unprocessed or semi-processed minerals. This is due to the fact that most markets where unprocessed minerals are bought are highly concentrated, in contrast with refined metals and components that are bought by a variety of industries, where the concentration among buyers is often less.

Another reason that can lead a developing country to pursue downstream processing is that this may increase its flexibility in obtaining financial resources for the implementation of its projects. However, the bargaining position of the developing countries will depend on the level of international concern over raw material supplies.

In planning an integrated approach for developing their non-ferrous industries, the developing countries must take into account the barriers or obstacles to the development of further processing.

Developing countries have to face the problem of marketing metals, because the markets in some metals are highly concentrated and selling them requires a reasonably extensive marketing organization. These factors can prevent a developing country, even though it has a cost advantage, from achieving market entry.

Another obstacle is the lack of internal technological knowledge which can prevent an integrated development of the non-ferrous metals industries. Furthermore, there are new technological developments, such as continuous casting in the copper industry, that have the effect of making it more difficult for producers located at a considerable distance from the main markets to compete effectively. The lack of an adequate infrastructure in many developing countries is another barrier which leads to increased capital requirements and higher costs of new production facilities.

7. Final considerations

This Expert Group Meeting, considering the limited success of the industrialization process in many developing countries to date, the current process of world-wide industrial restructuring, and the severe financial constraints to the process of accumulation facing the developing countries, should try to identify the possibilities of further processing of minerals and the logic of development that the non-ferrous metals industries must follow in order to achieve a more self-reliant and integrated development. On the basis of this, the meeting should then identify key issues to be discussed at the first consultation on the non-ferrous metals industries.

Table 1

WORLDWIDE CONSUMPTION OF NON-FERROUS METALS

(thousand tonnes)

	1970	1975	1980	1983[1/]	1970-83 Growth Rate (%)
Aluminium	9996	11350	15312	14666	3.0%
Copper	7271	7458	9385	9050	1.7%
Tin	227	219	223	210	-0.6%
Nickel	577	576	717	672	1.1%
Zinc	5056	5066	6131	6308	1.7%
Lead	3871	4526	5348	5263	2.4%

1/ Estimated.

Sources: World Metal Statistics; Mining Annual Review 1984.

Table 2

Prices of Non-ferrous Metals[1/]

	Aluminium		Copper		Tin		Nickel		Zinc		Lead	
	London Metal Exchange Cash settlements[2/] £ per metric tonne	US Producer Price[3/] Cents per lb.	London Metal Exchange Cash settlements[2/] £ per metric tonne	US Producer Price[5/] Cents per lb.	London Metal Exchange Cash settlements[2/] £ per metric tonne	US Producer Price[3/] Cents per lb.	London Metal Exchange Cash settlements[2/] £ per metric tonne	US Producer Price[5/] Cents per lb.	London Metal Exchange Cash settlements[2/] £ per metric tonne	US Producer Price[3/] Cents per lb.	London Metal Exchange Cash settlements[2/] £ per metric tonne	US Producer Price[5/] Cents per lb.
1971	N/Q	29.00	444.43	51.43	1437.97	167.35	N/Q	1.33	127.11	16.13	103.93	13.82
1972	N/Q	26.41	427.96	50.62	1506.59	177.47	N/Q	1.40	151.04	17.75	120.73	15.03
1973	N/Q	25.00	726.82	58.85	1962.19	227.56	N/Q	1.53	345.46	20.66	174.58	16.29
1974	N/Q	34.13	877.00	78.77	3498.60	397.27	N/Q	1.74	528.38	35.95	252.88	22.53
1975	N/Q	39.79	566.81	63.25	3092.45	339.82	N/Q	2.07	335.66	38.95	185.63	21.53
1976	N/Q	44.34	782.40	68.98	4256.74	349.24	N/Q	2.26	394.95	37.01	250.70	23.10
1977	N/Q	51.34	750.25	66.21	6185.15	499.38	N/Q	2.28	338.12	34.39	354.11	30.76
1978	N/Q	53.08	710.50	65.81	6710.30	587.03	N/Q	2.08	309.14	30.97	342.79	33.65
1979	756.31	59.40	934.08	92.21	7281.37	713.05	N/Q	2.72	349.86	37.39	567.66	56.64
1980	766.63	69.57	941.75	101.31	7227.21	768.49	2809.57	3.42	327.42	37.43	391.29	42.45
1981	623.51	76.00	865.55	84.21	7088.74	648.40	2951.19	3.43	425.05	44.56	363.37	36.53
1982	567.00	76.00	846.14	72.80	7305.51	586.86	2750.91	3.20	425.47	38.47	310.72	25.54
1983	952.67	77.67	1048.84	77.86	8572.77	601.28	3088.86	3.20	505.82	41.39	279.97	21.68

Source: World Metal Statistics.

1/ Average prices.
2/ Primary ingots, minimum 99.5% purity.
3/ US producer last price as quoted by "Metals Week".
4/ High grade cathodes, prior to 1 December 1981, Wirebars.
5/ US producer cathodes as quoted by "Metals Week", prior to 1973, Wirebars.
6/ Refined tin, 99.7% minimum purity.
7/ New York Dealer Price as quoted in "Metals Week".
8/ Refined Nickel, melting grade.
9/ Producer cathodes as quoted by "Metals Week".
10/ G.O.B. Zinc, 98% minimum purity
11/ High Grade Zinc as quoted by "Metals Week", prior to September 1980 Prime Western delivered.
12/ Refined Pig Lead minimum 99.97% purity.
13/ New York as quoted by "Metals Week".

Distr.
LIMITED

ID/WG.436/4
25 April 1985

ENGLISH

United Nations Industrial Development Organization

Expert Group Meeting on the Restructuring
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Vienna, Austria, 18-21 March 1985.

THE CONSULTATION PROCESS AND METHODOLOGICAL ASPECTS OF NON-FERROUS METALS*

Prepared by

UNIDO secretariat

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Through the Lima Declaration and Plan of Action, countries solemnly declared their firm intention to promote industrial development through concerted measures at the national, subregional, regional, interregional and international levels.[1/] In order to facilitate the establishment of a new international economic order, the Lima Declaration recommended the establishment of a System of Consultations in the United Nations Industrial Development Organization.[2/]

The Lima Declaration pointed out that, in view of the low percentage share of the developing countries in total world industrial production, and taking into account the policy guidelines and qualitative recommendations made in the Lima Declaration, the share of the developing countries should be increased to at least 25 percent of total world industrial production by the year 2000, while making every effort to ensure that the industrial growth achieved is distributed among the developing countries as evenly as possible.[3/] The Lima Declaration also pointed out the necessity for Governments of developing countries to adopt measures which would ensure the exercise of their national sovereignty over their natural resources and the full utilization of these resources and of human and material potential at their disposal, not only at the national level but also within the framework of systems of economic co-operation.[4/]

The Lima Declaration emphasizes the importance for Governments of developing countries of establishing effective control over their natural resources and harmonizing policies for their exploitation, conservation, transformation and marketing, as an indispensable condition for economic and social progress.[5/]

1/ Lima Declaration and Plan of Action, para. 24, p.4
2/ Ibid., para. 26, p.4
3/ Ibid., para. 28, p.5
4/ Ibid., para. 29, p.5
5/ Ibid., para. 34, p.6

UNIDO, in accordance with its mandate in the Lima Declaration, established a system of continuing Consultations at the global, regional and sectoral levels, the main principles, objectives and characteristics of which are the following[6/]:

(a) identifying the problems associated with industrialization and considering all aspects of those problems;

(b) monitoring trends in world industry with a view towards preventing and solving the associated problems;

(c) considering ways and means to accelerate industrialization, seeking action-oriented measures to increase the share of developing countries in industrial output, and creating new industrial facilities in developing countries contributing to the establishment of a New International Economic Order;

(d) the Consultation process should make negotiations possible among interested parties at their request;

(e) the goal of the Consultation process and the resulting negotiations is the promoting of international industrial co-operation;

(f) Consultations should include the elaboration of recommendations for action at national, regional, interregional and world-wide levels.

Consultations must be seen as a process designed to achieve the objectives of industrialization of the developing countries, as defined in the Lima Declaration and Plan of Action. The strategies of Consultations are based on an understanding of the changing situation of the world economy, the preferences and interests of the international community, new patterns of development emerging and the plans of the main actors (Governments, state ent rprises, trade unions, TNCs, and the private sector generally).

Consultations follow a process that is initially directed towards identifying the main problems in a specific industrial sector and in its relations with other sectors, changes in the structure of the sector and the role of developing countries in these changes, the prospects for development of the sector, and the strategies of the main actors. In this context, areas for co-operation are also identified. The following step, if one can talk of steps here, is to develop plans, programmes and instruments for development

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6/ The System of Consultations, PI/84, paras, 1-6 and 14(c).

that will make it possible to contribute through co-operation to the achievement of the objectives of development defined for a specific industrial sector.

The areas and issues for co-operation must be identified in the context of the stragegy defined for the series of Consultations and the state of progress reached, taking into account the strategies of the main actors in the international community. They should not be based on an empirical selection of areas of co-operation, nor on issues that mix various aspects at different levels of abstraction in a non-systematic way.

Co-operation as envisaged in the System of Consultations has to be seen in a broad perspective. Industrial co-operation must be conceived as going far beyond mere ad hoc investment promotion and establishing joint ventures or a means for transfer of technology; co-operation should be conceived in the context of the industrialization process in all its aspects in order to understand what role can be played by the non-ferrous metals sector and how the different actors in this sector can facilitate the development of the sector and thus the industrialization of developing countries.

The Consultation process is based on the preparation of various analyses and the convening of expert group meetings and seminars which examine relevant studies and documentation. Expert group meetings can further consider the various aspects pointed out in the foregoing description of the process that the Consultations should follow. However, the specific objectives of a particular expert group meeting depend on the situation and problems of an individual sector and on the progress achieved through Consultations on that sector. Some sectors, for example, have had up to four Consultations, in others the number has been fewer; and in the specific case of the non-ferrous metals industries, we are just initiating, with this Expert Group Meeting, the preparations for the First Consultation which is planned for the 1986/1987 biennium.

In our view, the discussions in this first Expert Group Meeting should not concentrate on specific technical problems or micro-economic aspects, nor on the specific figures presented in our preliminary work. We feel that the objective of this first meeting should be to arrive at a clear understanding of the interrelationship between the non-ferrous metals industries and the global process of industrialization in order to understand why it is necessary to think about, to plan and to realize the macro development of the non-ferrous metals industries. On the basis of the understanding thus achieved, the major areas and aspects for industrial co-operation can then be identified.

The points that we suggest should be touched upon in our discussions are the following:

(a) the identification of the main structural changes that took place in the 1970s and early 1980s in the non-ferrous metals industries and an analysis of its future prospects, starting from a clear understanding of the present situation;

(b) an analysis of possibilities, advantages and obstacles to a further processing of non-ferrous minerals by the developing countries, and how this further processing can contribute to the industrialization process and serve to expand the internal basis for autonomous accumulation. This analysis must take into account how further processing of natural resources had the effect of increasing the indebtedness of developing countries;

(d) the identification of possible areas of co-operation, between developed and developing countries and among developing countries themselves, and key aspects that can be developed through further analysis into issues to be considered at the First Consultation on the Non-Ferrous Metals Industries that will be held in the 1986/1987 biennium.

I would also like to bring to your attention a few methodological aspects that might be useful in our discussions during the new four days. This is not meant in any way to define or limit the line of analysis that should be followed. However, we considered it important to avoid the traditional ways of analysis that consist of examining a particular sector as a summation of factors seen in isolation from each other such as production, consumption, imports, exports, etc.

The theoretical analysis of a specific industrial reality, seen in the context of the Lima Declaration, must lead to a transformation of that reality in order to achieve a New International Economic Order. This means that the line of analysis that we suggest using in this Expert Group Meeting has to be action-oriented in the framework of the objectives defined for the Meeting and for the System of Consultations.

In our view, the possibilities for increasing the degree of processing of non-ferrous minerals in the developing countries through co-operation must be conceptualized in the context of an integrated approach that will lead to a more self-reliant development. In this perspective, further processing has to permit the achievement of a greater internal articulation of the non-ferrous metals industries with other key activities in those countries. The modality of integrated development of the non-ferrous metals industries will depend on the characteristics of the different developing countries and on the degree of development of their non-ferrous metals industries and the other industries or sectors linked to those industries. The situation will vary from those countries in which the non-ferrous metals and the other related industries and sectors are at an embryonic stage of development or even non-existent, to those developing countries in which the development of those industries and sectors is already relatively advanced.

The non-ferrous metals industries and the industries and sectors linked with them constitute a subsystem of production that contains the main elements for the reproduction of the non-ferrous metals industries; therefore, our analysis of those industries must consider the entire subsystem. The subsystemic analysis can enable us to achieve a global understanding of the logic of development on the non-ferrous metals industries that a partial approach cannot. This subsystemic approach will permit an analysis of the possibilities for co-operation that includes all the main activities belonging to the non-ferrous metals sector and the other sectors linked with it. This is essential because the activities of the main actors (Governments, state enterprises, TNCs, etc.) extend beyond the limits of the sector itself, and in some cases the principal areas for co-operation are not within the sector but in activities that are upstream, downstream or horizontally linked to the sector.

As part of the subsystemic analysis of the non-ferrous metals industries it is important to define the subsystem in which these industries operate. This definition can be based on quantitative and qualitative aspects, taking into consideration the input-output relations between the non-ferrous metals industries and the related sectors as well as the impact that developments in the related sectors have on structural change and technological innovation in the non-ferrous metals industries.

To define the subsystem, it should be understood that the non-ferrous metals industries seen at the world-wide level have important relations with the capital goods industries, the iron and steel sector, the energy sector, and the construction sector. Therefore, a fundamental point is that structural changes in the capital goods industries have a considerable impact on the level and the logic of development of the non-ferrous metals industries. Changes in the iron and steel sector also affect the development of those non-ferrous metals that are mainly used as inputs by this industry. The considerable increases in the price of petroleum in the 1970s also had a significant impact on the profits, technological innovation and redeployment of the non-ferrous metals industries. The strong structural relations among those different activities were clearly shown in the crisis of the late 1970s and early 1980s.

The analysis of the non-ferrous metals subsystem must be based on the understanding of the dynamic of the subsystem and the problems arising from it by identifying the main internal characteristics of the non-ferrous metals industries, as well as the nature of the interrelationships between these industries and the other sectors with which they are linked. This analysis must not be neutral; it has to be seen in the perspective of achieving a more coherent national productive system in the developing countries.

The essential characteristics and type of interrelations of the various industrial activities that comprise the subsystem differ according to the role played in the reproduction process by their type of production. Final, intermediate and primary production each has a distinct function in this process and therefore different types of linkages, internally and externally, as well as a different physical and technical base and social organization.

On the other hand, the type of participation of a particular country in the international division of labour acquires different modalities depending on the degree of national integration, the predominance of one of the different types of production and the relative share of its production that is oriented to the world market. In the context of the process of reproduction, the logic of development of the non-ferrous metals industries depends on an articulated set of variables expressing the technical and socio-economic relations of production.

A country's choice of a particular technological alternative in the non-ferrous metals industries will have a significant impact on its input-output transformation, employment, costs, degree of dependence, etc. Also, the physical infrastructure available in a country (ports, roads, railways, etc.) has a considerable influence on various aspects (costs, finance, etc.) of the development of the non-ferrous metals industries.

The socio-economic analysis of the non-ferrous metals sector must take into consideration the power relations between the different parts of the upstream and downstream process and other industries linked horizontally to the non-ferrous metals industries, expressed mainly in the relative prices and degree of control that the different industries have within the subsystem.

The different technical, social and economic aspects identified, and their interrelations, have a different impact in the various developing countries, centrally-planned economy countries, and developed-market economy countries. This analysis enables us to identify present similarities, differences, conflicts and contradictions within the same group of countries or between the various groups as well as to identify the key elements that determine the strategy of the major protagonists (Governments, state enterprises, TNCs, small- and medium-scale enterprises, trade unions, etc.)

However, the study of the present situation of the non-ferrous metals subsystem, its main parts and industries is not sufficient; it has to be seen in its historical perspective; that means that, having defined the key aspects of the present situation, it is necessary to analyse its past and future development. In this dynamic analysis it is essential to identify the major

trends shaping the development of the non-ferrous metals industries, such as the trend towards concentration or deconcentration, trends in technological progress, the tendency of the rate of profit, etc. This analysis should also identify the logic of the international division of labour that is currently taking place. For example, the Lima Declaration foresees a decentralization of production as a result of the process of internationalization of capital. Is this really happening in the industrial sector seen as a whole, and specifically in the non-ferrous metals industries? On the basis of the historical analysis and the study of new aspects that are appearing, it is of singular importance to identify the main factors that will influence the future development of the sector and the plans of the main protagonists.

Distr.
LIMITED

ID/WG.436/5
25 April 1985

ENGLISH

United Nations Industrial Development Organization

Expert Group Meeting on the Restructuring
of the Non-ferrous Metals Industries

Vienna, Austria, 18-21 March 1985.

REPORT*

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V.85-25481

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INTRODUCTION

1. The Expert Group Meeting on the Restructuring of the Non-ferrous Metals Industries was convened at Vienna, Austria, from 18 to 21 March 1985. The meeting was attended by 13 participants and 4 observers from 11 countries, 2 inter-governmental organizations, 1 non-governmental organization, and 1 United Nations body (see Annex I).

Background

2. In the Lima and New Delhi Declarations, the full sovereignty over natural resources and effective control over their exploitation, transformation and marketing were considered to constitute for developing countries an indispensable condition for economic and social progress[1/].

3. The Lima and New Delhi Plans of Action stressed the importance of developing countries achieving a progressively higher degree of domestic processing of their national resources[2/]. At the Fourth General Conference of UNIDO, it was stated that mineral processing promotes economic development and that, due to the process of restructuring that is taking place at the world-wide level, domestic processing of minerals in developing countries appears to be the trend of the 1980s.

4. The Industrial Development Board, at its seventeenth session in 1983, requested the Executive Director to start preliminary preparations for the possible holding of the First Consultation on the Non-ferrous Metals Industries during the 1986-1987 biennium[4/].

1/ Lima Declaration and Plan of Action, March 1975, PI/38, para. 34; New Delhi Declaration and Plan of Action, February 1980, PI/72, para. 49.

2/ PI/38, para. 58(e); PI/72, para. 32.

3/ Fourth General Conference of the United Nations Industrial Development Organization, Item 5(f), Policies and Measures for Domestic Industrial Processing of Raw Materials in Development Countries (ID/CONF.5/12), paras. 18, and 119.

4/ Official Records of the General Assembly, Thirty-eighth Session, Supplement No. 16 (A/38/16), para. 76(3).

5. As a first step in preparation for the First Consultation on the Non-ferrous Metals Industries, UNIDO decided to convene the Expert Group Meeting in order to seek the advice of participants on the selection of key aspects to be considered at that Consultation.

Objectives

6. The objectives of the meeting were:

(a) to analyse the new patterns of development of the non-ferrous metals industries and the strategies of the main actors, within the context of the global restructuring process that is taking place in the world economy;

(b) to identify the possibilities, advantages and obstacles for a further processing of non-ferrous minerals in the developing countries that would lead to a more integrated and self-reliant development;

(c) to identify key issues that could be discussed at the First Consultation on the Non-ferrous Metals Industries.

Documentation

7. Each participant was requested to write a short paper (10 pages) about the situation of the non-ferrous metals industry in his/her country, in order to provide the meeting with further background information on which to base its discussions and help it to achieve its objectives. The outline of the main points for inclusion in the country papers that were sent to participants is given in Annex II. The documents issued for the Expert Group Meeting are listed in Annex III.

I. AGREED CONCLUSIONS AND RECOMMENDATIONS

8. In the light of the overall goals, objectives and themes examined by the first meeting of experts on the restructuring of the non-ferrous metals industries, the following conclusions and recommendations were reached:

(a) There is a need to analyse the possibilities for a greater degree of processing of non-ferrous metals in the developing countries within the framework of an overall concept of national, sub-regional and regional development that takes account of the inter-relations of the non-ferrous metals industries with other related industrial sectors, such as capital goods, iron and steel, construction, etc.;

(b) There is a need to promote, within the context of an overall process of industrialization at the national, sub-regional and regional levels, integrated forms of development of the non-ferrous metals industries which are based on a detailed understanding of the ways in which the demand for final products affects the productive processes. Within this perspective of development, there is a need to define the type and degree of integration of the non-ferrous metals industries that is desirable and possible at the national, sub-regional and regional levels, as well as to examine the possibilities for most effectively using the international markets;

(c) Because not all non-ferrous metal products can, in the near- and medium term, be effectively utilized in the producing countries and regions, it will be necessary to promote the expansion of national and regional markets, in addition to developing and expanding new uses of such products world-wide. In this context, attention should be given to recently developed and new approaches, including for example, the location of certain joint processing and manufacturing plants in the principal consuming countries, where appropriate and feasible, with the aim of removing barriers to sales in such markets and thereby gaining technological and managerial expertise.

(d) Because of the changes in investment patterns which have appeared in the non-ferrous metals sector and the current severe restrictions on foreign exchange which developing countries are experiencing, there is a need to put into practice new methods of financing, which will permit a more effective use of the resources available to developing countries;

(e) There is a need to examine and develop, in each of the non-ferrous metals industries, alternative technologies and practices which are appropriate to the scale of developing countries' economies and to the level and type of resources available to such countries, and which protect the environment and the health and safety of workers;

(f) There is a need to examine past and present efforts of co-operation and to put into practice new forms of co-operation among developing countries and between developing and developed countries, in order to promote a more effective process of integrated industrial development in the developing world, taking due consideration of the developed countries' need for security of supply;

(g) The possibility and desirability of centralizing information available within the United Nations system in the field of non-ferrous metals should be analysed with the aim of avoiding duplication of effort and achieving the maximum feasible dissemination of information which may already be available within the system;

(h) As part of the process of preparation for the First Consultation on the Non-ferrous Metals Industries, UNIDO should promote closer relations with the producer associations in the non-ferrous metals field.

(i) UNIDO, in its preparations for the First Consultation on the Non-ferrous Metals Industries, should sponsor meetings of experts at the sub-regional and regional level, with the aim of examining the possibilities, advantages and barriers to an integrated and more self-reliant development of the non-ferrous metals industries at the sub-regional and national levels, as well as examining new forms of co-operation, financing and alternative technologies;

(j) UNIDO should prepare appropriate documentation for the expert meetings and, in this context, should co-ordinate its efforts with universities and other institutions which are undertaking work in the non-ferrous metals sector at the global, regional and sub-regional levels.

II. ORGANIZATION OF THE MEETING

Opening of the meeting

9. The Expert Group Meeting was opened by the Head of the Negotiations Branch of UNIDO. He described UNIDO's mandate under the Lima Declaration and Plan of Action to establish a System of Consultations[5/] and outlined the main principles, objectives and characteristics of the System.[6/] He pointed out that Consultations should be seen as a process designed to achieve the objectives of industrialization in the developing countries, as defined in the Lima Declaration and Plan of Action. The initial steps in that process consisted of analysing the structure, changes in the structure, problems and prospects for development of a specific industrial sector, as well as the strategies of the main actors and areas for international co-operation in the sector. Further steps were the elaboration of plans and programmes that could contribute through co-operation to the achievement of the development objectives defined for the sector.

10. He indicated that the discussions of this First Expert Group Meeting should not concentrate on specific technical problems or micro-economic aspects of the non-ferrous metals industries, but should aim at achieving a

5/ PI/38, op. cit., para. 26.

6/ See The System of Consultations (PI/84), paras. 1-24.

clear understanding of the non-ferrous metals sector as a basis for identifying potential areas for industrial co-operation. An important question on which the discussions should focus was an analysis of the possibilities, advantages and obstacles to a further processing of non-ferrous metals by developing countries and ways in which mineral processing could contribute to a country's industrial development. He stressed the importance of taking into account in the discussions the possibilities of developing an integrated approach that would permit a greater internal articulation of the non-ferrous metals industries with other key activities of the developing countries.

11. He pointed out that the non-ferrous metals industries and the industries and sectors linked with them constituted a subsystem of production that contained the main elements for the reproduction of the non-ferrous metals industries; therefore, an analysis of these industries had to consider the entire subsystem. The subsystemic analysis could make possible the achievement of a global understanding of the logic of development of the non-ferrous metals industries that a partial approach could not. The subsystemic approach would permit an analysis of the possibilities for co-operation that included all the main activities belonging to the non-ferrous metals sector and the other sectors linked with it. That was essential because the activities of the main actors (governments, state enterprises, TNCs, etc.) extended beyong the limits of the sector itself, and in some cases the principal areas for co-operation were not within the sector but in activities that were upstream, downstream or horizontally linked to the sector.

12. He emphasized that the different technical, social and economic aspects identified through the analysis of the subsystem had a different impact in the various developing countries, centrally-planned economy countries, and developed market economy countries. That analysis made possible the identification of similarities and differences within the same group of countries or between the various groups as well as the identification of the key elements that determined the strategy of the major protagonists. That analysis would permit the selection of areas and possible partners for co-operation.

Election of officers

13. Mr. Byron Blake (Jamaica), Director of the Economics and Industry Division of the Carribean Community Secretariat was elected Chairman; Mr. György Dobos (Hungary), was elected Vice-Chairman.

14. A drafting group was elected to prepare the draft conclusions and recommendations, composed of Messrs. C. Aguirre (Andean Group), A. Casal (Chile), M. Ericsson (Sweden), F. Gonzalez Vigil (Peru), P. Jourdan (Zimbabwe), and S. Zorn (USA).

Adoption of the agenda

15. The following agenda was adopted:

1. Opening of the meeting
2. Election of officers
3. Adoption of the agenda
4. Presentation by the UNIDO secretariat
5. Discussion and exchange of experience
6. Adoption of the conclusions and recommendations of the meeting

Adoption of the conclusions and recommendations

16. The conclusions and recommendations of the meeting were adopted by consensus at the closing session on 21 March 1985.

III. SUMMARY OF DISCUSSIONS

Presentation of the background and discussion papers

17. A member of the UNIDO secretariat presented the background paper (ID/WG.436/1) and discussion paper (ID/WG.436/3) prepared by the secretariat and outlined the main themes of the discussion: changes in the structure of the non-ferrous metals sector and prospects for the future; the possibilities, advantages and obstacles for further processing of non-ferrous metals by

developing countries; areas for international co-operation to promote a more favourable development of the sector and the identification of issues for consideration at the First Consultation.

18. A UNIDO consultant presented the background paper he had prepared entitled "Mining and Mineral Processing in Developing Countries" (ID/WG.436/2). He summarized the demand projections for non-ferrous metals to the end of the 1980s. He listed some of the factors influencing those projections, including the rate of economic growth in the developed countries, which were the main consumers of non-ferrous metals, the substitution of plastics and other materials for non-ferrous metals; the re-cycling of scrap metal in developed countries and its impact on traditional mining sources.

19. He also stressed the fact that a global analysis must involve careful examination of the unique situations of individual countries, each with its own resource endowment, market size, level of industrialization, etc. It would be possible to progress from an analysis of individual countries to an examination of possiblities for sub-regional and regional co-operation.

General discussion

20. Most participants agreed that demand for non-ferrous metals would grow very slowly in the short- and medium-term and that a compilation of global demand projections already made would give sufficient information so that it was unnecessary to make new ones at present. Several participants thought that most demand projections currently available were too optimistic, while a few participants thought that current demand predictions were too pessimistic. One participant thought it was necessary to reach agreement about probable demand levels up to the year 2000 in order for further discussions to be meaningful.

21. Further discussion about the question of demand centred around the possibilities for future demand growth in the developing countries and the need to increase demand by promoting greater use of non-ferrous metals, nationally, sub-regionally and regionally. One participant elaborated on the experience of the aluminium industry in his country which had been able to raise the per capita consumption of aluminium significantly by means of direct measures to promote its use.

22. It was pointed out that the rate of growth of demand, just as the rate of economic growth in a country, was not only dependent on international trends but was directly influenced by decisions taken in the country. Therefore, Governments of developing countries had a responsibility for deciding how to make best use of their resource endowments. They could be assisted by the elaboration of a typology of countries and appropriate strategies that took into account the differences in different sub-regions and between countries at different stages of development.

23. Several participants talked about the problems of over-capacity in the non-ferrous metals industries, pointing to capacity closures in the developed countries, and stating that future demand growth would be greatest in the developing countries. It was pointed out that questions such as capacity closures were decided both on a political and on a technical basis.

24. The question of prices was discussed. One participant said that it was important to devise mechanisms to obtain favourable prices on the world market. Another participant pointed out the difficulty of arriving at an objective determination of the value of a primary commodity which represented a non-renewable resource in a country. It was, therefore, necessary to examine the way in which prices were determined. He questioned the logic of applying one world market price to many different countries with different economic systems and socio-economic conditions.

25. The discussion of further processing of non-ferrous metals in developing countries began with an examination of the different roles that non-ferrous metals could play within the context of a development strategy oriented towards satisfying the most important needs of the population through an integrated development of agriculture and industry and the establishment of an autonomous basis of development. Such a strategy could be defined as the progressive construction of a coherent productive system in a country, or within a sub-region. It was that concept of development that was supported by the Lima Declaration and Plan of Action.

26. In the context of such a development strategy, non-ferrous metals could play three different roles. The first possibility was a direct role: the extraction and processing of the mineral in order to produce goods that form

part of the internal basis of development. The second possibility was an indirect role: non-ferrous metals were extracted, processed and sold on the world market to obtain foreign exchange to pay for necessary imports; that could also stimulate the development of other industries and create employment. The last possibility was the extraction of minerals and exporting them in their crude form, as ores or concentrates, in order to obtain foreign exchange to pay for imports. That was the most indirect role of non-ferrous metals in national economic and social development.

27. Many participants gave examples of the negative effects that had been observed in developing countries following a purely export-oriented strategy of non-ferrous metals development, whether the minerals were exported in a crude or processed form. Severe problems of indebtedness, falling prices and decreased demand for non-ferrous metals, rising costs of energy and of imports of capital goods, and rising interest rates all tended to cast serious doubts on the overall benefits to be gained from investing scarce capital in building up a processing capacity primarily for exports to the world market.

28. Some participants reported on the positive results that an integrated approach to the development of the non-ferrous metals sector had had in their countries, pointing out the stimulating effect on the expansion of infrastructure, the development of less developed regions of the country, and the development of related industrial sectors. It was pointed out that to achieve such a beneficial impact, it had been necessary to establish national and regional research facilities that made possible the development of technology suited to local conditions.

29. It was emphasized that there were several prerequisites in order for further processing of non-ferrous metals in developing countries to have a favourable impact. These were:

(a) an analysis of the unique situation of each country and each subregion in terms of its mineral and energy resources;

(b) an integrated approach to the development of the sector and the other economic sectors with which it is linked;

(c) consideration of possibilities for sub-regional and regional integration;

(d) consideration of the possibilities of obtaining the maximum value added and promoting employment in the country.

30. A careful analysis of the obstacles to further processing facing individual countries was necessary in order to identify such obstacles and elaborate ways to overcome them.

31. It was pointed out that the effective barriers to the export of processed metals to developed countries were not so much tariffs as non-tariff barriers.

32. The example of Japan was mentioned which exports non-ferrous metals in the form of finished goods, but the relevance of this example for the present state of development of the majority of mineral-exporting countries was questioned.

33. In this context, efforts to diversify production were essential, for example through the economic utilization of by-products or the use of polymetallic ores to produce new metals, as well as measures to develop further outlets, both domestically and internationally.

34. In the discussion of technology for the development of the non-ferrous metals sector, participants emphasized the necessity of using the most up-to-date scientific knowledge and research results to develop technologies that were appropriate to the socio-economic, technical, infrastructural and environmental conditions of specific developing countries and sub-regions.

35. The question of scale was discussed and the importance of developing technologies to make possible mining and processing operations on a scale suited to particular mineral deposits, size of the country and level of technical development.

36. It was pointed out that the choice of technology was a political decision and that an important objective for developing countries would be to have access to sufficient information and experience to enable them to choose the scale and technology that was best suited to a particular constellation of resources on the basis of a complete knowledge of all the alternative possibilities open to them.

37. It was generally agreed that patterns of investment in developing countries had changed greatly; that the direct foreign investment and commercial loans which had characterized investment in the 1960s and 1970s were no longer available, and that it was unlikely that they would become available in the current circumstances, although it was possible that in future foreign investment might increase in importance again.

38. It was suggested that the decline in national and regional capacity to finance investments could be counteracted by measures such as the establishment and expansion of regional joint financing institutions that could help to make capital available, to spread risks, to reduce reliance on commercial and global multilateral financing institutions, and to promote the use of local or regional currencies for such investments. It was pointed out that since the profits that could be realized from mining operations were very high, it should be possible to use them for financing further investments.

39. Among the suggestions for the establishment and expansion of new and improved forms of co-operation between developed and developing countries was co-operation based on buy-back or compensation arrangements, whereby part of the repayment of investment was in the form of the metal produced. Such long-term arrangements had the advantage of guaranteeing markets and stable prices for at least part of the output of metal.

40. Possibilities for forms of sub-regional or regional economic integration as a mode of co-operation among developing countries were discussed. Some of the problems reported included the complexities encountered in negotiating agreements, the difficulties of relations between unequal partners (in terms of size, resource endowments and state of development), and the effects of the economic crisis. Some of the successes reported included the establishment of

preferential trade areas and other measures to facilitate trade within a region by reducing the reliance on hard currency for such transactions. A paradoxically positive effect of the current economic crisis and foreign currency shortages was seen in the increased interest in domestic firms and neighbouring countries as sources of supply for inputs for the mining and processing industries.

41. It was stated that scenarios should be elaborated outlining modalities of co-operation based on the realities of each sub-region. It should also be recognized that sub-regional and regional co-operation should take into account trade and exchanges not only of non-ferrous metals, but also other metals and resources.

42. The experience and potential value of producer associations was also discussed, including possibilities for stabilizing prices and markets as well as for making more complete information available to members.

43. An example of new forms of co-operation being developed could be seen in the Law of the Sea Treaty which regulated the exploitation of marine nodules as sources of non-ferrous minerals.

44. One possibility for co-operation was mentioned that could be considered under very specific technical and economic conditions, which was the establishment of joint ventures between producer and consumer countries with jointly owned facilities for product manufacturing in the consumer country.

45. The Expert Group discussed the issue of information related to the non-ferrous metals industries. The importance was emphasized of having access to reliable statistical data on stocks, quantities mined and processed, prices, exports and imports, capacities, etc. The following points were brought up in this context:

(a) It was considered desirable to increase the general availability of information on non-ferrous metals by developing mechanisms for improved collection and dissemination, through a central co-ordinating facility;

(b) It was pointed out that the lack of an adequate form of co-ordination meant that there was a great lack of awareness about existing information, which often led to a duplication of effort in research;

(c) Some of the sources or potential sources of information that were pointed out were producers' associations, state enterprises and government agencies. Co-operation with these sources could make this information more generally available.

46. With regard to the preparations for the First Consultation on the Non-ferrous Metals Industries, the importance of examining the sector not only at the global level but also at the regional and sub-regional levels was emphasized. It was suggested that the preparation of regional studies and the organization of regional expert group meeting should make possible more in-depth analysis of the sector and a better understanding of possibilities for regional and sub-regional co-operation.

47. It was suggested that in preparing studies of the sector, UNIDO could benefit from greater co-operation with other researchers knowledgeable in the subject and to this end should extend its contacts with universities, research institutes, producer associations and other national and international non-governmental organizations in developed and developing countries.

48. In developing a methodology to guide the preparations for the Consultation, UNIDO should follow the subsystemic approach outlined for the present Expert Group Meeting, taking into account not only the non-ferrous metals industries themselves, but also all the upstream and downstream activities as well as those linked horizontally with the sector.

49. It was considered essential to identify the main actors involved in each sub-region (public and private enterprises, national, regional and transnational enterprises), and their roles and strategies in the current and future development of the non-ferrous metals industries as part of the analysis of the possibilities and constraints faced by Governments in establishing their policies in the sector.

Annex I

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Annex II

Points for inclusion in the country papers

I. Bibliography and statistics of the country or institution

1. Studies and reports in the field of non-ferrous metals
2. Principal journals in the field
3. Statistics available and period of time covered

II. Factual analysis

A. Mines

1. Investment: amount and origin; level of technology used
2. Production: quantity produced and quantity exported
3. Evolution of export prices
4. Location of the mine(s)
5. If mine is operated by a TNC:
   - type of contract (joint venture, other)
   - share of equity
   - principal product of the TNC
   - secondary products of the TNC
   - diversification
6. If mine is a national enterprise:
   - organization of exports (direct, through trade merchants, through the London market)
   - countries to which ore is exported
   - final uses of the exports
   - if the mineral is not processed domestically, reasons for not having further processing within the country
7. Reserves: initially and in 1985
8. Effects of the mines on the national economy:
   - employment
   - technology transferred
   - qualification of manpower and technical staff
   - development of industries related to the mine
   - effects on the balance of payments (trade and capital)
9. Transportation of minerals: type and origin (national, foreign) of the means of transport used to the port and from the port
10. New mines to be opened (potential, projected)
11. Social legislation related to:
    - working conditions
    - health and safety
    - wage levels

B. Industrial Processing

1. Capital invested: amount and origin (national, foreign), initially and thereafter
2. Debt (national, foreign)
3. Technological level
4. Mineral prices:
   - for export
   - for processing
5. Return on investment

6. Uses of the profits
7. Government subsidies
8. Most recent balance sheet and profit and loss statements
9. Effects on the economy:
   - employment
   - technology transferred
   - qualification of manpower and technical staff
   - development of activities around the plant
   - effects on the balance of payments (trade and capital)
10. New projects
11. Relations between the Government and TNCs
12. Social legislation relating to:
   - working conditions
   - health and safety
   - wage levels

Annex III

List of documents

Prepared by the UNIDO secretariat

The Development and Restructuring of the Non-ferrous Metals Industries	ID/WG.436/1
Mining and Mineral Processing in Developing Countries: S. Zorn, UNIDO Consultant	ID/WG.436/2
The Restructuring Process in the Non-ferrous Metals Industries and the Possibilities for Further Processing of Non-ferrous Metals in Developing Countries: Discussion Paper	ID/WG.436/3
The Consultation Process and Methodological Aspects of Non-ferrous Metals	ID/WG.436/4

Prepared by participants

O Complexo do Aluminio no Brazil: Realidade e Perspectivas nos Quadros do Mercado Mundial: Paulo Bastos Cezar

Bauxite Bargaining: Guinea versus the Multinationals of the Aluminium Industry: Bonnie K. Campbell

Potencial de Chile en Mineria del cobre: Alberto Casal

Les Métaux Non-ferreux dans une Stratégie d'Industrialisation: Questions Préliminaires: Gérard de Bernis

A Survey of Hungary's Non-ferrous Metal Industry: György Dobos

Swedish Non-ferrous Metals Industry: Magnus Ericsson

New Technologies, Industrial Restructuring and Changing Patterns of Metal Consumption: Fernando Gonzales-Vigil

The Non-ferrous Metals Industry of Zimbabwe: Philip Paul Jourdan